

WHITE PAPER

ATSF-GD-FDB
Capt Grice/2-6379
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Subject: Firing of the M549/M549A1 Rocket Assisted Projectile in Rocket Off Mode

Purpose: The purpose of this white paper is to disseminate information concerning the firing of the M549 155mm Rocket Assisted Projectile in rocket off mode (rocket cap in place).

Summary:

The M549 series of 155mm Rocket Assisted Projectiles (RAP) were developed to provide added range capability to High Explosive munitions. During testing in the 1970's, the cap which provides obturation between the propellant gases and the rocket motor failed when the projectile was fired in "rocket off" mode, that is with the cap in place. This failure is known as a "burn through" and can result in the undesirable ignition of the rocket motor.

This burn through caused a restriction to be placed on all M549 series projectiles, allowing for rocket on (rocket cap removed) firing only. In the meantime, the cap was redesigned to correct the problem. The FT 155 AO-0 firing table was produced concurrently with the fielding of the M549 series projectile, and contains the aiming data for the M549 series projectile. At the time of the table's production, firing of the M549 series projectile was restricted to firing in rocket on (rocket cap removed) mode only, and there was no aiming data provided in the FT 155 AO-0 for rocket off (rocket cap in place) mode.

Numerous other documents were produced, using the ammunition restriction and firing table as a source. These documents, including but not limited to the TM 43-0001-28, 6- series of Field Manuals, weapon system operator maintenance manuals (-10's), and USAFAS lesson plans cite that the M549 series projectile may only be fired in rocket on (rocket cap removal) mode. Automated fire control systems, including the Battery Computer System (BCS) and the Paladin's Automated Fire Control System (AFCS) currently contain no provision to produce rocket off mode firing data.

Firing of the M549 series munition in "rocket off" mode is not the preferred method of employment, however there exists now (for combat emergencies) and did exist in the past (as a spotter for the M785 Nuclear projectile) a requirement to do so. The rocket cap, as was stated earlier, was redesigned to preclude burn through. Upon completion and application of the redesigned cap (Part Number 9276682 Revision D or later) to most existing stocks of the munition and its inclusion on subsequent production runs of the munition, the restriction to firing the M549 series munition in rocket off mode was rescinded. The firing table (FT 155 AO-0) was updated to provide the necessary aiming data for both "rocket on" (rocket cap removed) and "rocket off" (rocket cap in place) modes (FT 155 AO-1).

Problem:

Not all existing stocks of the M549 projectile were fitted with the new cap. Approximately 30,000 M549 projectiles are configured with the old cap *that may cause rocket ignition in rocket off mode* (rocket cap in place). All M549A1 projectiles are configured with the reconfigured rocket cap (PN 9276682) that corrects the inadvertent rocket ignition problem. The previously listed publications are in error, and must be amended, as do the automated systems.

Solution:

All concerned agencies (i.e., TRADOC, ARDEC, USAFAS, etc.) must be notified of the change in the operational parameters of the M549 series projectiles, and all erroneous documentation must be corrected. In addition, all concerned agencies must be notified of the following information to preclude the firing of M549 projectiles in a potentially unsafe manner. This will require changes to publications, automated systems, and training. The following information lists the locations, lots, and other pertinent information for the M549 projectiles which do not have the reconfigured rocket cap:

**LOCATION AND CONDITION CODE OF M549 PROJECTILES WITHOUT REDESIGNED
ROCKET CAPS**

Location of Available M549 projectiles without redesigned cap	Condition Code A	Condition Code C	Condition Code E	Condition Code F	Condition Code H	Total Available M549 projectiles without redesigned cap
ANNISTON	3811					3811
BLUEGRASS	3987		8			3995
CRANE	8461		543	440		9444
HAWAII	32					32
HAWTHORNE	229	24		745		998
KUWAIT		14				14
LETTERKENNY	506		1901			2407
MCALESTER	5947		103	83		6133
NG	518				1	519
TOOELE	0		835	152		987
WRSA-K	640		115			755
Grand Total	24131	38	3505	1420	1	29095

**M549 PROJECTILES WITHOUT THE REDESIGNED ROCKET CAP BY LOCATION, RIC,
CONDITION CODE, LOT DESIGNATOR, AND QUANTITY**

Location	RIC	Cond Code	Lot Number	Quantity available for issue	Quantity frozen and unavailable for issue
NG	B14	A	IOP77A005-013	32	0
NG	B14	A	IOP77E006-006	184	0
NG	B14	A	IOP77F007-001	192	0
NG	B14	H	IOP77F008-003	1	0
NG	B14	A	IOP77F008-003	78	0
NG	B14	A	IOP77H008-008	32	0
CRANE	B14	A	IOP76L005-001	3	0
CRANE	B14	E	IOP76M005-011	120	0
CRANE	B14	A	IOP76M005-011	2011	0
CRANE	B14	E	IOP76M005Y011	236	0
CRANE	B14	E	IOP77A005-013	168	0
CRANE	B14	A	IOP77A005-013	949	0
CRANE	B14	A	IOP77C006-001	2116	0
CRANE	B14	A	IOP77D006-005	816	0
CRANE	B14	A	IOP77E006-006	195	0
CRANE	B14	E	IOP77F006Y008	3	0
CRANE	B14	F	IOP77F007Y002	56	0
CRANE	B14	E	IOP77F008-001	8	0
CRANE	B14	E	IOP77F008Y001	8	0
CRANE	B14	A	IOP77H008-005	459	0
CRANE	B14	F	IOP77H008-005	384	0
CRANE	B14	A	IOP77H008-007	1912	0
MCALESTER	B14	E	IOP76L005-007	103	0
MCALESTER	B14	F	IOP76L005-009	82	0
MCALESTER	B14	A	IOP76M005-011	1416	0
MCALESTER	B14	A	IOP77A005-013	193	11
MCALESTER	B14	A	IOP77C006-001	1130	0
MCALESTER	B14	A	IOP77C006-003	1011	0
MCALESTER	B14	A	IOP77D006-005	525	0
MCALESTER	B14	A	IOP77F008-001	0	28
MCALESTER	B14	F	IOP77F008-003	1	0
MCALESTER	B14	A	IOP77F008-003	917	0
MCALESTER	B14	A	IOP77H008-005	431	0
MCALESTER	B14	A	IOP77H008-007	324	0
HAWTHORNE	B14	A	IOP76L005-009	3	0
HAWTHORNE	B14	F	IOP76L005-010	3	0
HAWTHORNE	B14	A	IOP76M005-012	160	0
HAWTHORNE	B14	C	IOP77A005-013	24	0
HAWTHORNE	B14	A	IOP77C006-001	18	0
HAWTHORNE	B14	F	IOP77C006-003	46	66
HAWTHORNE	B14	F	IOP77D006-005	280	0
HAWTHORNE	B14	A	IOP77E006-006	48	0

HAWTHORNE	B14	F	IOP77H008-005	400	0
HAWTHORNE	B14	F	IOP77H008-007	8	0
HAWTHORNE	B14	F	IOP77H008-008	8	0
ANNISTON	B14	A	IOP77A005-013	1984	0
ANNISTON	B14	A	IOP77D006-005	1119	0
ANNISTON	B14	A	IOP77E006-006	0	40
ANNISTON	B14	A	IOP77H008-005	708	100
BLUEGRASS	B14	A	IOP76M005-011	312	0
BLUEGRASS	B14	A	IOP77A005-013	1136	64
BLUEGRASS	B14	E	IOP77C006-001	8	0
BLUEGRASS	B14	A	IOP77D006-005	355	0
BLUEGRASS	B14	A	IOP77H008-005	0	32
BLUEGRASS	B14	A	IOP77H008-007	2184	0
LETTERKENNY	B14	A	IOP76L005-004	506	141
LETTERKENNY	B14	E	IOP76L005-007	152	0
LETTERKENNY	B14	E	IOP76L005-009	611	0
LETTERKENNY	B14	E	IOP77A005-013	312	0
LETTERKENNY	B14	E	IOP77A005-014	250	0
LETTERKENNY	B14	E	IOP77H008-007	576	0
TOOELE	B14	E	IOP76L005-007	73	0
TOOELE	B14	E	IOP76L005-010	4	0
TOOELE	B14	E	IOP76M005-012	104	0
TOOELE	B14	E	IOP77C006-003	256	0
TOOELE	B14	F	IOP77C006-003	8	0
TOOELE	B14	F	IOP77F007-001	96	0
TOOELE	B14	F	IOP77F007-002	48	0
TOOELE	B14	E	IOP77F007-002	342	0
TOOELE	B14	E	IOP77F008-001	48	0
TOOELE	B14	A	IOP77F008-001	0	154
TOOELE	B14	E	IOP77F008-003	8	0
HAWAII	B14	A	IOP77C006-003	32	0
WRSA-K	B14	E	IOP76L005-009	91	0
WRSA-K	B14	A	IOP76M005-011	6	0
WRSA-K	B14	A	IOP76M005-012	6	0
WRSA-K	B14	A	IOP77A005-013	7	0
WRSA-K	B14	A	IOP77C006-003	584	0
WRSA-K	B14	A	IOP77E006-006	5	0
WRSA-K	B14	E	IOP77F007-002	24	0
WRSA-K	B14	A	IOP77F008-001	2	0
WRSA-K	B14	A	IOP77F008-004	23	0
WRSA-K	B14	A	IOP77H008-008	7	0
KUWAIT	B14	C	IOP76M005-011	14	0

Point of contact at USAFAS is Capt Mike Grice, USMC, Gunnery Instructor, DSN 639-6379,
Email gricem@usafas.army.mil.